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EVALUATION OF THE INSECTICIDE CONTROL PROGRAM AT THE GENEVA STATE SEED ORCHARD ALABAMA FORESTRY COMMISSION 1981

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INTRODUCTION

An integral part of the pest management program at the Geneva State Seed Orchard is an intensive preventive insecticide application schedule. Four years ago Forest Pest Management (FPM) assisted the Alabama Forestry Commission (AFC) with an evaluation of their spraying operations. At that time the sprayer was calibrated and spray coverage was assessed. As a part of an ongoing effort to improve upon the effectiveness of insect suppression activities a current spray evaluation was performed, by FPM personnel (Alexandria and Asheville Field Offices) on May 19 & 20, 1981 (at the request of the AFC).

Prior to this evaluation 3 sprays of Malathion® 5E (12/15/80, 1/28/81, 3/4/81) were applied to slash pine for thrips control and 2 sprays of Guthion® 2S (3/17/81, 4/20/81) were applied to both loblolly and slash pine for seedbug and coneworm control. Four additional Guthion applications are scheduled at 30 day intervals during the summer of 1981.

OBJECTIVE

To evaluate the techniques used to apply insecticide at the Geneva State Seed Orchard.

PROCEDURES

The AFC uses a FMC 757 airblast sprayer mounted on a truck bed. The sprayer appeared to be in good working condition.

The tank was partially filled with water and Rhodamine B dye. Twelve ounce soft drink cans covered with Kromekote® cards were hung in the upper 2/3 of the canopy of three 35 ft loblolly pine trees. The AFC applicator, who usually makes the pesticide applications, sprayed 3 rows containing the target trees as if he were making his normal monthly application. During this application truck speed and spray coverage were evaluated.

The tank was drained and filled with water. A pressure gauge was attached at the nozzle to determine if the machine, under full throttle, was producing adequate pressure.

Discussion among all participants followed concerning the discharge rate, the desired application rate, and the pesticide concentration.

RESULTS AND DISCUSSION

AFC personnel involved in the insecticide spray program have been following procedures and parameters that should insure adequate coverage and residues. The spray parameters currently used in the spray operations are listed in table 1.

Spray Concentrations - Guthion

The spray concentration currently registered for seed orchard application and the concentration being applied at the Geneva Seed Orchard are listed in table 2. Some confusion exists concerning the procedure used in calculating the proper amount of Guthion in order to achieve a 1% dilution. This dilution rate is calculated based upon weight of active ingredient divided by the total weight of the liquid. Neither the 3 pints per 10 gallons of water nor the 1% dilution rate should be exceeded.

In the unrogued slash pine portion of the orchard, trees were planted on a 15' x 30' spacing. This is a planting density of approximately 97 trees per acre. It is assumed that the crowns are now currently occupying the 15' interval between trees. AFC personnel wish to apply 1 gal of solution per tree or 97 gal of solution per acre. The calculated discharge rate should be 8.8 gal/min when applied at 1.5 mph. The nozzle arrangement selected by the AFC, applied solution at a rate of 9.0 gal/min which is acceptably close to the desired rate of 8.8 gal/min.

In the rogued loblolly portion of the orchard, the stocking density is currently 50 trees/acre. Visual estimates indicate that the tree crowns generally occupy approximately 20'. AFC personnel have determined that a similar discharge rate as applied to the slash pine will result in an application rate of 1-2 gal/tree. FPM supports this decision because of the slightly larger crown development in the loblolly blocks. Based upon the 20' crown diameter the calculated application rate under the operating parameters is 1.33 gal/tree. Both the 1 gal/tree rate on the slash pine and the 1.33 gal/tree rate on the loblolly pine are well within the label recommendations and should result in adequate coverage.

Spray Concentrations - Malathion 5E

The spray concentration being applied to the slash pine blocks at the Geneva Seed Orchard for thrips control is listed in table 2.

The application rate of 1.0 gal/tree, mentioned previously, applies to the Malathion sprays for thrips.

Spray Coverage

The sprayer seems to be operating well. Spray deposits are reaching the upper 1/3 of the crown. Kromekote cards indicate the typical 1 sided coverage recovered by cylindrical targets. Generally, the surface facing

Table 1. Spray parameters for airblast sprayer at the Geneva State Seed Orchard.

FACTOR	
Application Speed	1.5 mph
Nozzle Pressure (Full Throttle)	180 PSIG
Sprayer Discharge Rate	9.0 gal/min
Amt. of Solutiion per Tree	
Slash	1.0 gal
Loblolly	1.33 gal
Trees per Acre	
Slash	97 trees
Loblolly	50 trees
Acreage Covered with 1 Tank of Mix (500 gal)	5.25 ac

Table 2. Insecticide Concentrations

	Guthion 2S	Water
EPA Registered Conc.	3.0 pts	10 gal
Geneva Spray Conc.	3.5 pts	10 gal
	Malathion 5E	**Water**
Geneva Spray Conc.	1.25 gal	100 gal

the bole of the tree does not receive as much spray as the outer surface. The mean drop density at the top and middle 1/3 of the tree for both the outer and inner surfaces of the targets are summarized for all 3 targets in table 3. It appears that the outer surfaces are receiving adequate coverage. It is doubtful whether any changes in spray technique would result in better coverage on the inner surfaces.

CONCLUSIONS

AFC personnel have done a good job calibrating and operating their sprayer. Based upon the coverages obtained and the concentrations being applied FPM feels that these procedures should help minimize the losses in treated areas. No specific recommendations are made concerning the airblast application procedures; however, the following list of suggestions is offered for consideration by the AFC.

SUGGESTIONS

1) Currently, inventory trees are being monitored for losses in the treatment areas only. It would be beneficial to select trees of the same clones in the unsprayed check block. Generally, when FPM assists in a post-suppression evaluation we attempt to designate 2 ramets of the same 6 clones in both the unsprayed and the sprayed treatment areas. Appoximately 5 or 6 branches are tagged and the flowers and the 2nd year cones are counted. It is possible to make this evaluation more statistically precise by following the more intensive sampling procedures currently being developed by David Bramlett, Southeastern Forest Experiment Station, P. O. Box 5106, Macon, GA 31208.

A follow-up inventory is taken at harvest and the benefits of the spray efforts should be reflected in a reduction in losses in the sprayed blocks when compared to the unsprayed blocks.

2) Samples of residue on the needles can be analyzed to determine if the current application procedures are comparable to deposits obtained in other spraying operations. The following procedures should be followed when collecting samples. Wait until the foliage has dried after the pesticide application, then collect needle samples from 6 trees. Protective clothing should be worn during these sampling procedures. Needles should be taken from all 4 aspects of the upper 1/3 of the crown (usually north, south, east, and west). The needles from each tree can be pooled into 1 sample, wrapped in aluminum foil (shiny side out), secured with masking tape, placed in a ziplock bag and frozen. The label should include date, orchard, treatment chemical, and tree location.

3) If the residue levels obtained from the analysis suggested in (2) are similar to the levels obtained in our current aerial application pilot studies, the AFC may want to consider aerial application. Considerable savings could be realized in insecticide costs when applying the 3 lbs of active ingredient currently recommended under the Guthion 2L and 2S supplemental label for aerial application. Table 4 summarizes cost estimates in response to a request made by orchard personnel.

Table 3. Mean drop density for airblast spray operations.

	Upper 1/3 Crown $\bar{x}$ no of drops/cm^2		Lower 1/3 Crown $\bar{x}$ no. of drops/cm^2	
	Card 1	Card 2	Card 1	Card 2
Tree # 1				
Inner Surface	5	4	0	37
Outer Surface	26	>250	26	(Complete coverage)
Tree # 2				
Inner Surface	38	3	>150	21
Outer Surface	>250	232	>250	(Complete coverage)
Tree # 3				
Inner Surface	9	0	100	1
Outer Surface	>250	>250	>250	(Complete coverage)

Table 4. Comparison of the insecticide amount and cost of aerial and airblast application techniques.

	Aerial Application		Airblast Application		Difference Between Aerial & Airblast Applications	
	Amount	Cost[1/]	Amount	Cost	Amount	Savings
Guthion 2S (ai/ac)	3 lbs ai/ac	$25.44	8.8 lbs ai/ac	$74.62	5.8 lbs ai/ac	$49.18
Guthion 2S Application on 45 ac orchard	135 lbs ai	$1,144.80	396.0 lbs ai	$3,358.08	261.0 lbs ai	$2,213.28
6 sprays Guthion 2S on 45 ac orchard	810 lbs ai	$6,868.80	2,376.0 lbs ai	$20,148.48	1,566.0 lbs ai	$13,279.68

[1/] Cost is based on the 1981 purchase price ($16.95) per gal.

FPM would appreciate the opportunity to work closely with the Alabama Forestry Commission with their seed orchard pest management program. If any question or problems arise, please feel free to call Julie Weatherby (318/473-7296).

PRECAUTIONARY STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key out of reach of children and animals and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing.

If your hands become contaminated with a pesticide, wash them immediately with soap and water. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove the clothing immediately and wash skin thoroughly. After handling or spraying pesticides, do not eat or drink until you have washed with soap and water.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicide from equipment, do not use the same equipment for insecticides or fungicides that you used for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary landfill dump, or crush and bury them in a level, isolated place.

NOTE: Some states have restrictions on the use of certain pesticides. Check your state and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Environmental Protection Agency, consult your county agent, state extension specialist or FPM to be sure the intended use is still registered. For further information or assistance, contact Forest Pest Management, Alexandria Field Office, Pineville, La., 71360, (Telephone: FTS 497-7280, or Commercial 318/473-7280).